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Answering your questions about Avian Influenza

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What is influenza?
Influenza is a disease caused by a virus. Every winter, "the flu" attacks, infecting the respiratory tract and causing generalized symptoms (fever, chills, aches) in the people and animals it affects. Most people recover completely, but every year "seasonal flu" is responsible for about 36,000 deaths in the U.S., depending on the strain of virus and the immune system of the infected individual.

What is "avian influenza"?
"Avian influenza" refers to any influenza virus that affects birds. Birds are considered to be the reservoirs for most influenza viruses, and sometimes can show symptoms from flu just as humans do—sneezing, lack of appetite, nasal discharge. Occasionally, a new and more lethal virus emerges—such as the subtype of influenza virus that has caused particular problems recently in other parts of the world.

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Why is this avian influenza so special?
The current outbreaks involve a "high-pathogenic" strain of avian influenza. Most avian influenza viruses are "low pathogenic," meaning they cause only mild symptoms in a few birds.

The current outbreaks, however, are the largest and most severe avian influenza outbreaks in poultry on record. Many countries have been affected at the same time, and unprecedented numbers of domestic poultry have been lost due to the disease or culling of suspect flocks. Despite dramatic control measures, including mass culling, confinement of flocks, and (in some countries) vaccination of poultry, the disease is considered endemic (established) in many countries.

The current outbreaks are remarkable also in that human cases have occurred in conjunction with the poultry cases. From information available, people affected with this virus strain (high-pathogenic H5N1 avian influenza) have had close contact with diseased poultry or with surfaces and objects contaminated by bird droppings. Examples of these contacts include picking up dead birds and slaughtering and plucking sick or dead birds.

This strain of influenza has not, as of yet, been positively shown to be highly transmissible from person to person, although rare cases of possible person-to-person spread have been reported (for example, suspected transmission of the virus from child to parent or other relative).

What do "low-pathogenic" and "high-pathogenic" mean?
"Pathogenicity" refers to the ability of the virus to cause disease. Avian influenza viruses can be classified as either "low-pathogenic avian influenza" (LPAI) or "high-pathogenic avian influenza" (HPAI). These terms are generally used only to describe avian influenza.

Most avian influenza viruses are considered low-pathogenic, meaning they only cause mild symptoms in a few birds. In contrast, high-pathogenic avian influenza, which describes the strain of H5N1 being seen now in Asia and Europe, infects birds severely and quickly, resulting in rapid death losses due to the disease itself and to stringent culling practices of entire flocks.

This distinction in bird populations may not transfer to how a particular virus may affect humans. For example, some high-pathogenic avian influenza strains cause severe disease in birds but little to no disease in humans.

There are three types of influenza viruses: A, B, and C. Type A influenza viruses are very widespread across many hosts: they can infect people, birds, pigs, horses, dogs, cats, and many other animals, but the natural hosts for type A viruses are wild birds. Type A influenza viruses (and only type A) are further classified by two proteins on their surface: H and N.

Type B influenza viruses only infect people. Influenza type C viruses cause mild illness in humans but no epidemics or pandemics.

What are H and N and "H5N1"?
The particular strain of virus that has infected poultry, some wild birds, and some people in other parts of the world is subtype H5N1 of a type A avian influenza virus.

H and N are two proteins on the surface of the virus. H stands for hemagglutinin, and N stands for neuraminidase. They have very exact shapes that can bind, like a key in its lock, with places on the surface of cells in the respiratory tract.

There are 16 different H subtypes and 9 different N subtypes, so many different combinations are possible. These subtypes of type A influenza viruses are named according to these proteins, for example, H3N8. Only

some subtypes are in general circulation among people (H3N2, H1N1, H1N2). Other subtypes are more commonly found in animals: for example, H3N8 can cause illness in horses and dogs. In addition, H3N2, H1N1, and H1N2 can affect pigs.

Within subtypes, different strains exist. "Strain" refers to subtle differences in the makeup of the virus that can result in differences in how quickly or severely or even what species the virus can infect. Within the subtype H5N1, for example, may exist several strains, some of which can affect their hosts more severely than others.

Can influenza viruses change?
Yes. Viruses can change in two different ways, called "drift" and "shift."

"Drift" refers to changes in the genetic makeup of a virus that happen continually and gradually over time. If an individual is infected by a specific strain of virus, antibodies develop in the bloodstream against that strain. As newer strains appear, the antibodies to the previous strains are ineffective, and the newer strain is able to become more established. This is why humans have to take a new flu shot each winter—last season's influenza vaccine is no longer effective against this winter's influenza virus due to the drift in genetic make up of the virus over the past year.

"Shift" is a much more abrupt, dramatic change in the makeup of a virus. It is thought to occur when an individual becomes infected by two different subtypes at the same time. The virus may reassort its H and N proteins, resulting in a whole new subtype of virus that has not affected humans previously. Scientists studying the current avian influenza outbreak are concerned about such a shift occurring in the H5N1 avian influenza virus.

Influenza viruses are constantly changing by the process of "drift," but only occasionally do they dramatically change by the process of "shift."

Can a "low pathogenic" virus become "high pathogenic"?
Yes. The concern is that a low-pathogenic H5N1 strain could change into a high-pathogenic strain through "drift" or "shift."

Where have the high pathogenic avian influenza (HPAI) outbreaks occurred?
Initially seen in Southeast Asia (Hong Kong, China, Cambodia, Indonesia, Thailand, Vietnam), outbreaks have recently occurred in Eurasia, Europe, and Africa. Japan and Korea have experienced outbreaks but now are considered free of HPAI as a result of their control programs.

How many species of animals get influenza?
Influenza viruses are known to have infected many species besides birds. The H5N1 strain has been found to experimentally or naturally infect cats, dogs, foxes, ferrets, weasels, rats and mice, rabbits, seals, otters, badgers, and macaques.

The behavior of the virus in most of these species is still largely unknown.

Have we ever seen avian influenza in the United States? In South Dakota?
Low pathogenic avian influenza is commonly seen in domestic poultry flocks on a regular basis in the US. It is not considered a threat to human health. Diagnosis of low pathogenic avian influenza virus in South Dakota has not been recorded, but the virus probably has been present in some birds in the past.

The US has experienced three high pathogenic avian influenza virus outbreaks:

Year	Location	Strain
1924	East Coast	H7
1983	Northeastern U.S.	H5N2
2004	Southern U.S.	H5N2

In all cases, the disease was quickly eradicated with cooperation from federal, state, local, and industry representatives, with no serious consequences to human health.

What birds can be infected with avian influenza?
More than 90 species of birds have been shown to be susceptible to avian influenza, including wild and domestic chickens, turkeys, ducks, pheasants, quail, geese, guinea fowl, and wild waterfowl. Pet birds can get avian influenza, but since their contact with domestic and wild birds is reduced, the risk is lower.

How does avian influenza spread between birds?
Wild birds, especially waterfowl, are the natural hosts for avian influenza. They may or may not exhibit symptoms. They carry the virus in their intestines and shed it through their droppings. Birds that become infected can also shed virus in their saliva and nasal secretions. Susceptible birds become infected when they have contact with the virus by being exposed to nasal/respiratory secretions or fecal material from infected birds.

How does avian influenza spread from birds to people?
Spread of high-pathogenic avian influenza virus from birds to people results from human exposure to infected birds. Most of the human cases to date have occurred in rural areas where people and small poultry flocks live in close proximity to each other. Transmission has occurred when bird owners gather birds for transport to market, children play with a back yard flock of infected birds, or when infected birds are handled or butchered. Despite recorded human cases from sick birds, the number of these recorded cases is rather small compared with the huge number of birds affected and the many opportunities for people to come in contact with sick birds. At this time, scientists generally believe that it is difficult for humans to become infected with this virus.

Why are we so worried about avian influenza spreading to people?
There are two reasons:
1. As mentioned above, this H5N1strain of high-pathogenic avian influenza virus has caused very severe disease or death in the people who have become sick with it.
2. Of more concern is the possibility that the virus will change (via “drift” or “shift”) into a form that could easily be passed from person to person. Since the human population would have no natural immunity against this strain, a large percentage of the population would be at risk of contracting the virus and becoming ill. This could be the start of a pandemic.

I had a flu shot. Does that protect me from avian influenza?
No. The avian influenza virus is in a different subgrouping of viruses. What a flu shot will do is reduce the risk of simultaneous infection with human and avian flu viruses. This is believed to be the way viruses swap genes and perhaps produce a “hybrid” subtype with pandemic potential.

What is a pandemic?
A pandemic is a widespread, global outbreak of disease. The term could refer to any infectious disease; however, its current use pertains to a possible global influenza outbreak. (You may hear similar words with different meanings: An “epidemic” is local or national in scope; “endemic” means constantly present within a geographical area.)

How do we look for avian influenza in the United States?
Although high-pathogenic H5N1 avian influenza is not currently in the U.S., state veterinary diagnostic labs such as the SDSU ADRDL, the USDA, and state veterinarians and their staffs are specially trained to recognize and deal with this and other foreign

animal diseases should they be introduced to this country. Also, the USDA pays close attention to any low-pathogenic subtype H5 or H7 outbreaks, because of the possibility of those strains changing into high-pathogenic viruses. Ongoing surveillance activities also take place among commercial poultry operations and in migrating wild birds.

What are we doing to head off avian influenza from the United States?
All imported birds (including poultry, pet birds, and birds for exhibit at zoos) are subject to strict quarantine and testing regulations before entering the U.S. Trade restrictions are in place for those countries with active outbreaks of high-pathogenic avian influenza. Customs and Border Protection agents maintain vigilance for birds or poultry products smuggled into the country.

Are there vaccines available that could head off a pandemic?
For poultry, yes. However, vaccinating poultry is not recommended in countries where there have been no outbreaks. There is no H5N1 vaccine available for humans at the present time. Anti-viral medications may be used for treatment, but their effectiveness and recommended dosages are not currently known relative to avian flu.

Does avian influenza infect pheasants?
Avian influenza virus has been isolated from pheasants; however, losses in pheasant flocks due to high-pathogenic avian influenza virus have not been reported. The behavior of avian influenza virus in pheasants in natural settings is still largely unknown.

Can I get avian influenza from cleaning birds I shot?
Low-pathogenic avian influenza is generally not considered a significant human health risk. Some strains of low-pathogenic avian influenza can cause eye infections in people. The risk of people contracting high-pathogenic avian influenza from cleaning wild birds is presently unknown. However, common-sense precautions should be taken when cleaning any form of wild game.

What are these precautions?
These common-sense measures are not unique to avian influenza. Birds or any game animals that are obviously sick or diseased should not be cleaned or consumed.

Use rubber gloves when cleaning, even if they seem awkward on your hands. Some people may wish to further decrease their risk by wearing goggles and a face mask (>N95 rating). When field dressing and when cleaning at home, avoid contact with bird droppings. Do not touch your mouth or eyes while cleaning the bird. Make sure that you wash your hands when you're done.

Properly and carefully wrap and dispose of the remains and take care that cleaned birds are properly transported and stored.

Can I catch avian influenza from birds if they are sick?
The spread of high-pathogenic avian influenza virus from birds to people has so far predominantly resulted from extensive human contact with infected birds, as previously mentioned. Low-pathogenic avian influenza has not been demonstrated to be a significant human health risk.

If you intend to visit a poultry farm for any reason, always observe all the safety precautions the owner or manager asks. These precautions are for the safety of the flock as well as yours. Be understanding if the owner denies you access.

Can people get avian influenza from eating poultry or eggs?
Avian influenza virus (and other viruses and bacteria) is quickly and effectively deactivated by proper handling and cooking of poultry.

These general food safety recommendations protect against other food-borne illnesses in addition to avian influenza.

1. Wash hands before and after handling raw food.
2. Keep raw poultry and unwashed eggs away from other foodstuffs.
3. Wash cutting boards, counter tops and utensils with hot, soapy water and then disinfect with diluted bleach after handling raw poultry or unwashed eggs.
4. Use a meat thermometer to ensure poultry reaches an internal temperature of 165 F.
5. Thoroughly cook eggs (no runny yolks).

Inspection procedures at poultry processing plants ensure that birds sick for any reason, including avian influenza, do not enter the food chain.

Where can I find more information on avian influenza?

Useful Web sites are

http://sdces.sdstate.edu/avianflu/
www.cdc.gov/flu/avian
www.usda.gov/birdflu

Your local Extension educator and veterinarian are good sources of information. Poultry owners can refer to ExEx11016, Avian influenza and your flock, on the Extension Web site listed above.

Available on the web at: http://agbiopubs.sdstate.edu/articles/FS930.pdf
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